

New species and new records of *Danilia* (Gastropoda: Chilodontidae) from the Western Pacific

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ABSTRACT. New records of *Danilia* species from the West-Pacific are listed. *Danilia angulosa* n. sp., *D. galeata* n. sp. and *D. discordata* n. sp. are described and compared with similar *Danilia* species. A key to western Pacific *Danilia* species, including the new species, is proposed. The Recent worldwide species of *Danilia*, the number of which reach now therefore 11, are listed with their main distinctive features in an appendix.

RESUME. De nouveaux relevés de *Danilia* provenant du Pacifique occidental sont listés. *Danilia angulosa* n. sp., *D. galeata* n. sp. et *D. discordata* n. sp. sont décrites et comparées avec des espèces analogues de *Danilia*. Une clé de détermination des espèces de *Danilia* du Pacifique Ouest est proposée, en incluant les nouvelles espèces. Les espèces Récentes de toutes origines du genre *Danilia*, dont le nombre atteint à présent 11, sont énumérées en appendice avec leurs principales caractéristiques.

INTRODUCTION

The genus *Danilia* contains until now eight known Recent species: five species from the Western Pacific (from Japan to New Zealand) and three from Europe (from the north-eastern Atlantic and Mediterranean Sea). From a conchological point of view, species included in the genus are characterised by an exterior prominent varix bordering the outer lip of the aperture.

Collections at the MNHN (Muséum national d'Histoire naturelle, Paris) contain among others a very large trochoid material obtained by the numerous expeditions conducted in collaboration with the IRD (Institut de Recherche pour le Développement, Paris - ex-ORSTOM). Consequently, many areas of the Western Pacific have been investigated during these past 20 years, from Taiwan to Tonga. Not surprisingly, *Danilia* species were found in Chilodontidae material, with new records of known species and three new species that are described here.

Abbreviations

Repositories

AMS : Australian Museum, Sydney, Australia.
MNHN : Muséum national d'Histoire naturelle, Paris, France.

MZB: Museum Zoologicum Bogoriense, Bogor Jakarta.

NMNZ: Museum of New Zealand Te Papa Tongarewa, Wellington, New Zealand.

NSMT: National Museum of Science, Tokyo, Japan.

SHKMNH: Saito Ho-on Kai Museum of Natural History, Sendai, Japan.

ZMA: Zoölogisch Museum, Amsterdam, The Netherlands.

Other abbreviations

H : height

W : width

HA : height of the aperture

P1, P2, P3, ...: primary cords (P1 is the most adapical)

S1, S2, S3, ...: secondary cords (S1 is the most adapical)

T1, T2, T3, ...: tertiary cords (T1 is the most adapical)

stn : station

lv : live-taken specimens present in sample

dd : no live-taken specimens present in sample

sub : subadult specimen

Remark about distribution ranges

For bathymetric distribution, the range is taken from the internal intervals of the two extremes values.

SYSTEMATICS

We follow here the classification of Bouchet & Roeroi (in press), where Chilodontini (*Euchelus*, *Herpetopoma*, *Turcica*, *Danilia*, ...), earlier treated as a tribe of Trochidae, are ranked as a family Chilodontidae.

Superfamily SEGUENZIOIDEA Verrill, 1884

Family CHILODONTIDAE Wenz, 1938

Subfamily CHILODONTINAE Wenz, 1938

Genus *Danilia* Brusina, 1865

Type species: *Monodonta limbata* Philippi, 1844 (by monotypy) = *Monodonta tinei* Calcaro, 1839 – Recent, Mediterranean Sea.

Key to species of *Danilia* in the West-Pacific

1. One median spiral cord with rather sharp beads and producing a carena *D. angulosa*
– No median spiny carena 2
2. Shell globular 3
– Shell higher 4
3. Numerous close spiral cords with sharp beads *D. weberi*
– Thicker spiral cords with round beads and broader interval between them *D. eucheliformis*
4. Shell moderately high 5
– Shell very high 6
5. Broad interval between beads of spiral cords and axial ribs *D. insperata*
– Beads of spiral cords and axial ribs very close *D. kuroshio*
6. Whorls very convex, aperture small with regard to height *D. telebatha*
– Whorls only moderately convex, large aperture 7
7. Suprasutural cord strongly spiny, subsutural cord sharp, other cords flats *D. discordata*
– All cords moderately sharp *D. galeata*

Danilia angulosa n. sp.

Figs 1-7

Type material. Holotype (7.9 x 5.9 mm) MNHN (unnumbered). Paratypes: 3 MNHN (unnumbered), 1 AMS (C.443873), 1 NMNZ (M.273272).

Type locality. East coast of New Caledonia, Grand Récif Mengalia, 20°37'S, 165°07'E, 220 m [LAGON, stn 858].

Material examined. New Caledonia. LAGON: stn 858, 20°37'S, 165°07'E, 220 m, 1 dd (holotype). – BATHUS 1: stn DW692, 20°35'S, 164°59'E, 140-150 m, 1 dd sub. – BATHUS 4: stn DW882, 22°02'S, 165°56'E, 250-350 m, 1 dd & 1 dd sub (paratype NMNZ + paratype MNHN). – Loyalty Islands. Atelier LIFOU 2000: stn 1462, 20°47.1'S, 167°03.2'E, 70-120 m, 1 lv (paratype MNHN). – Stn 1469, 20°54.2'S, 167°00.4'E, 70-130 m, 1 dd and 1 d sub (paratypes MNHN). – Stn 1649, 20°54.2'S, 167°01.1'E, 150-200 m, 1 dd. – Stn DW1650, 20°54.15'S, 167°01.7'E, 120-250 m, 1 dd (paratype AMS). – Vanuatu. MUSORSTOM 8: stn DW1038, 16°49'S, 168°30'E, 469-472 m, 1 dd. – Fiji. MUSORSTOM 10: stn CP1384, 18°18.5'S, 178°05.8'E, 260-305 m, 1 dd. – BORDAU 1: stn CP1498, 18°41'S, 178°28'W, 300-307 m, 1 dd. – Tonga. BORDAU 2: stn DW1508, 21°02'S, 175°19'W, 555-581 m, 1 dd.

Distribution. New Caledonia, Loyalty Islands, Vanuatu, Fiji and Tonga, alive in 70-120 m, shells to 555 m.

Diagnosis. A typical small *Danilia* species with a rather high spire and a shoulder keeled by a sharp spiral cord. This cord defines on each whorl two areas: an apical area with only one clearly visible intermediate cord and a subsutural sharp cord, and an abapical area with a cylindrical shape and 4 cords, the most abapical fairly sharper. The columella shows a broad tooth.

Description. *Shell* rather small for the genus (height up to 7.9 mm, width up to 6.2 mm), turbinata, rather thin; spire moderately high, height 1.2x to 1.3x width, 2.1x to 2.5x aperture height; periphery subangular; anomphalous.

Protoconch missing on all available specimens.

Teleoconch of 4.5 to 5 slightly convex whorls, bearing prosocline threads and spiral cords; cords granular on first whorls, three of them sharp on last whorls; beads from cords produced by intersections with axial threads on 4 first whorls; axial threads almost obsolete on last whorl. Suture visible, impressed, weakly canaliculated. First teleoconch whorl convex, sculptured by about 15 slightly prosocline smooth ribs, interspace between ribs twice as broad as them; P1 and P3 appearing almost immediately, P3 stronger, just above suture; P2 appearing later at middle of whorl, weakest; cords evenly distributed, granular, beads of P3 weakly spiny; P4 completely immersed under suture, only detectable by connexions made by axial threads between beads of P3 and P4. On second whorl, all cords stronger, P3 still strongest, P1 moving just under suture; beads of P1 and P3 becoming sharp, apically oriented on P1 and horizontally on P3; S1

and later S2 appearing between the middle of second whorl and the beginning of third whorl, bearing small rounded beads. At beginning of the third whorl, P2 producing a shoulder at third fifth of the whorl; subsutural ramp oblique and slightly convex. On fourth whorl, additional tertiary cords T2 and T3 appearing respectively between P2 and S2, and between S2 and P3, as weak as S2, granular; axial threads still visible between P2 and P3, giving to this area a reticulate shape, and becoming obsolete between P1 and P2. At end of fourth whorl or at beginning of fifth whorl, beads of P2 becoming very sharp, adapically obliquely oriented with an angle of about 30° with horizontal line, stronger and more spaced than beads of P3. On fifth whorl, P3 peripheral; S3 and P4 becoming visible, bearing rounded beads; very faint tertiary cord T1 appearing between S1 and P2; remains of axial threads only visible in the neighbourhood of beads of P2 and P3, between T1 and T2; ramps on both sides of P2 almost straight, adapical ramp oblique with an angle of about 45°, abapical ramp almost vertical; distance between cords of abapical area of same size as cords.

distance between cords of adapical area two or three times broader than cords.

Aperture circular; outer lip flaring, with broad exterior prominent varix (width of about 0.4 mm) crossed by all spiral cords with production of weak thickening at meeting points, followed by a thin expanded lip of same size as varix and sculptured by spiral cords; inside of outer lip lirate within with 20 to 25 plications, the closest to columella fairly broader.

Columella straight, opisthocline, excavated, deeply notched, with one strong sharp prominent tooth at second third; columellar shield strong, concealing basal cords over which it lies.

Base moderately convex, sculptured with 7 to 8 granular spiral cords, similar in size; interspace between cords smaller than or equal to cords, filled with broad axial threads.

Colour of teleoconch yellowish or ochre beige, with brown dots on some spiral cords or brown flammules on whole whorls.

Operculum horny, multispiral, with about 7 whorls, initially with short growing edge and expanding more rapidly toward the edge.

	H	W	HA	H/W	H/HA
holotype	7.9	5.9	3.1	1.3	2.5
paratype LIFOU, stn 1469	7.4	5.6	3.1	1.3	2.4
paratype LIFOU, stn DW1650	7.5	5.6	3.1	1.3	2.4
specimen LIFOU, stn 1649	6.6	5.2	2.6	1.3	2.5
paratype LIFOU, stn 1462	7.2	5.8	3.5	1.2	2.1
paratype BATHUS 4, stn DW882	7.2	5.9	3.1	1.2	2.3
specimen MUSORSTOM 8, stn DW1038	7.4	5.5	3.0	1.3	2.5
specimen BORDAU 1, stn CP1498	7.2	6.0	3.3	1.2	2.2
specimen MUSORSTOM 10, stn CP1384	7.7	6.2	3.3	1.2	2.3
specimen BORDAU 2, stn DW1508	7.1	6.0	3.2	1.2	2.2

Table 1. – *Danilia angulosa* : Shells measurements in mm for mature types and specimens.

Discussion. Due to its keeled shoulder, *Danilia angulosa* n.sp. can hardly be confused with any other Recent species of *Danilia*.

However, *Danilia angulosa* n.sp. slightly resembles *Danilia tinei* (Calcara, 1839) (Figs 8-9) from Mediterranean Sea and north-eastern Atlantic, but this species has more convex whorls without shoulder and coarser sculpture with thick rounded beads.

The new species differs from *D. insperata* Beu & Climo, 1974 (Figs 28-29) from New Zealand because this taller species has a different sculpture on whorls with more numerous spiral cords that are similar in shape and evenly distributed, and a blunt columellar tooth.

D. angulosa n.sp. may also be compared to *D. weberi* Schepman, 1908 (Figs 10-14) from Taiwan to Tonga,

but this species is taller, with spiral cords that are more numerous, finer, similar in shape and evenly distributed, and has a quadrangular columellar tooth.

The new species is different from *Danilia eucheliformis* (Nomura & Hatai, 1940) (Figs 15-18) from Japan, the latter having more convex whorls, larger distance between spiral cords and a rounded columellar tooth.

Etymology. Angulosus (Latin : with angles) - with reference to the carinate shape of the shell.

***Danilia weberi* Schepman, 1908**

Figs 10-14

Danilia weberi Schepman, 1908: 73-74, pl II, fig 6.
Type locality: Indonesia.

Material examined. **South-western Pacific.** MUSORSTOM 7: stn CP629, 11°54'S 179°32'W, 400-420 m, 1 dd. **Fiji.** BORDAU 1: stn CP1394, 16°45'S, 179°59'E, 416 m, 1 dd. **Tonga.** BORDAU 2: stn DW1528, 21°14'S, 174°59'W, 587-592 m, 1 dd. - **Solomon Islands.** SALOMON 1: stn DW1831, 10°12.1'S, 161°19.2'E, 135-325 m, 1 dd. - Stn DW1856, 9°46.4'S, 160°52.3'E, 254-281 m, 1 dd. - **Indonesia, Kai Islands.** KARUBAR: stn DW13, 05°26'S, 132°38'E, 417-425 m, 2 dd. - Stn CP17, 05°15'S, 133°01'E, 439-459 m, 1 dd. - **Taiwan.** TAIWAN 2001: stn DW36, 21°54.8'S 120°36.2'E, 305 m, 1 dd.

Distribution. Western Pacific (from Taiwan to Tonga), 275-587 m.

Danilia eucheliformis (Nomura & Hatai, 1940)
Figs 15-18

Monodonta eucheliformis Nomura & Hatai, 1940: 61, pl III, figs 1a-b. Type locality: Japan (north-eastern Honshu).

Material examined. **Indonesia, Kai Islands.** KARUBAR: stn DW18, 05°18'S, 133°01'E, 205-212 m, 1 dd. - **Taiwan.** TAIWAN 2001: stn DW36, 21°54.8'S, 120°36.2'E, 305 m, 2 dd. - Stn DW37, 21°51.7'S, 120°35.8'E, 420 m, 2 dd. - Stn CP101, 24°48.2'S, 122°06.7'E, 248-257 m, 1 dd.

Distribution. Western Pacific (from Japan to Indonesia), 210-420 m.

Danilia kuroshio Okutani, 1968
Figs 30-32

Danilia kuroshio Okutani, 1968: 27, pl III, fig 4. Type locality: Japan (off Hachijo Island).

Material examined. **Loyalty Islands.** MUSORSTOM 6: stn DW418, 20°42'S, 167°03'E, 70-283 m, 8.3 x 6.7, dd. **Vanuatu.** MUSORSTOM 8: stn DW967, 20°19'S, 169°53'E, 295-334 m, 1 dd. - **Solomon Islands.** SALOMON 1: stn DW1778, 8°19.3'S, 160°34.0'E, 157-253 m, 1 dd. - Stn DW1856, 9°46.4'S, 160°52.3'E, 254-281 m, 1 dd. - Stn DW1857, 9°39.8'S, 160°48.6'E, 720-849 m, 1 dd.

Figures 1-11. Scale bar = 5 mm.

1-7. *Danilia angulosa* n. sp.

1-3. Holotype MNHN, northern New Caledonia, 220 m [LAGON, stn 858], 7.9 x 5.9 mm; 4. Paratype MNHN, Loyalty Islands, Lifou, 70-130 m [LIFOU, stn 1469], 7.4 x 5.6 mm; 5. Paratype MNHN, Loyalty Islands, Lifou, 70-120 m [LIFOU, stn 1462], 7.2 x 5.8 mm; 6-7. Specimen MNHN, Vanuatu, 469-472 m [MUSORSTOM 8, stn DW1038], 7.4 x 5.5 mm.

8-9. *D. tinei* (Calcara, 1839), Spain, off Malaga, 200 m, coll. C. Vilvens, 7.2 x 5.9 mm.

- **Indonesia, Kai Islands.** KARUBAR: stn DW22, 05°22'S, 133°01'E, 85-124 m, 1 lv.

Distribution. Western Pacific (from Indonesia to Vanuatu), 124-720 m.

Remarks. Regarding the Japanese specimens, the specimens of Western Pacific are smaller, but the other specific features are the same.

Danilia galeata n. sp.
Figs 19-24

Type material. Holotype (12.9 x 9.0 mm) MNHN (unnumbered). Paratypes: 2 MNHN (unnumbered), 1 MZB (MZB Gst. 12 518).

Type locality. Indonesia, Tanimbar Islands, 08°42'S, 131°53'E, 356-368 m [KARUBAR, stn CP25].

Material examined. All type material. **Indonesia, Tanimbar Islands.** KARUBAR: stn CP25, 08°30'S, 132°52'E, 336-346 m, 1 dd (paratype). - Stn CP69, 08°42'S, 131°53'E, 356-368 m, 4 lv (holotype and paratypes).

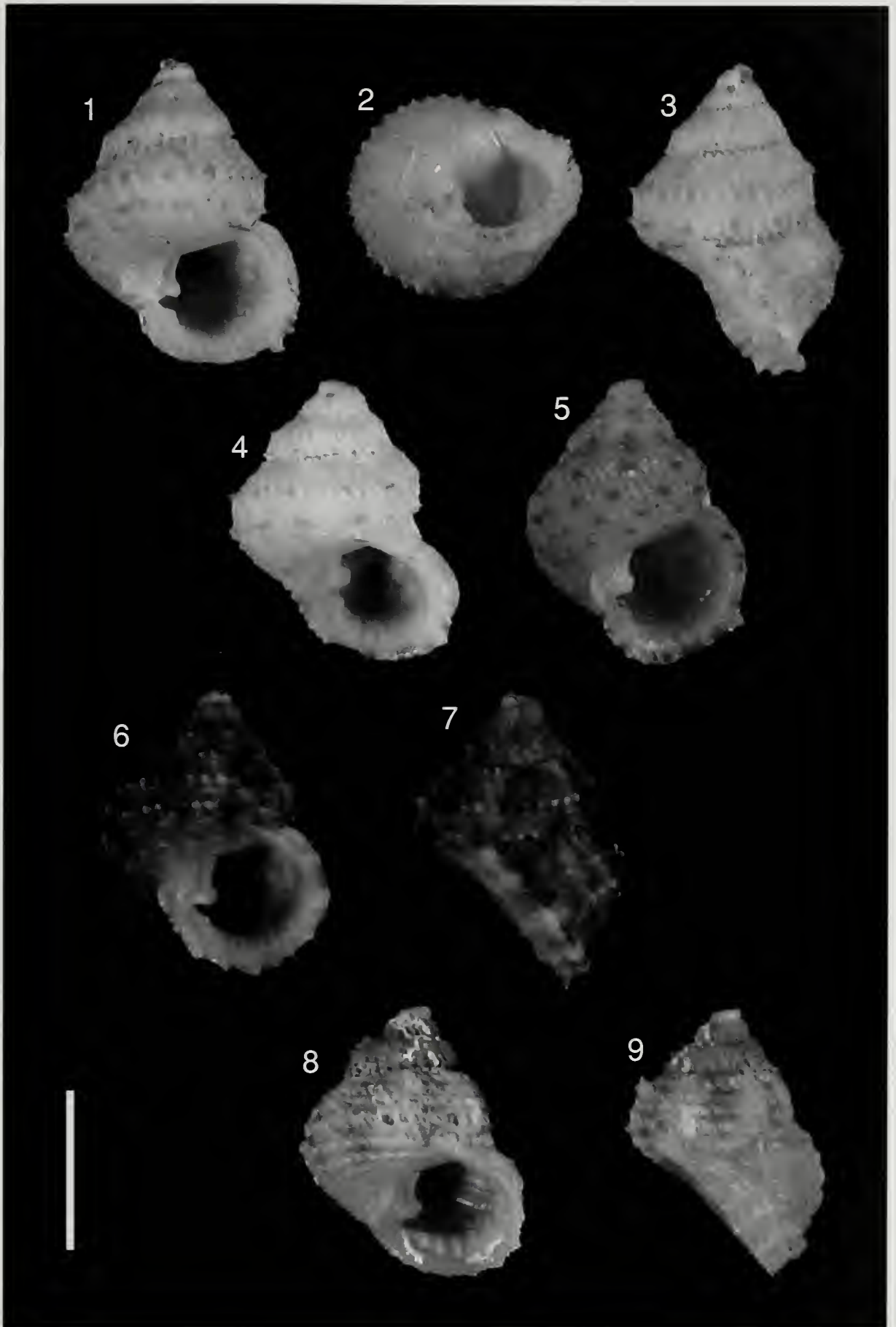
Distribution. Indonesia, Tanimbar Islands, 346-356 m.

Diagnosis. A typical rather big *Danilia* species with a high spire, a conical shape, 8 or 9 strong spiral cords on the last whorl with beads connected by strong axial ribs, an elliptic vertically elongated aperture and a broad obtuse columellar tooth.

Description. *Shell* rather great for the genus (height up to 16.6 mm, width up to 11.2 mm), conical, rather thin; spire high, height 1.3x to 1.5x width, 2.4x to 2.7x aperture height; periphery subangular; anomphalous.

Protoconch ca 250 µm in diameter, of about 1.25 to 1.5 whorl, smooth, sunken into first teleoconch whorl; apical fold straight without varix.

Teleoconch of 5 to 5.5 slightly convex whorls, bearing prosocline threads and spiral cords; cords granular on first whorl and becoming quickly sharp on succeeding whorls; beads from cords produced by intersections with axial threads on all whorls; axial threads still strong on last whorl. Suture visible, impressed, weakly canaliculated.



First teleoconch whorl convex, sculptured by about 18-20 slightly prosocline smooth ribs, interspace between ribs 2 times larger than width of ribs. On second whorl, all ribs stronger, interspace between ribs almost 3 times larger than width of ribs; P2, P3 and P4 appearing almost simultaneously, similar in size; P1 appearing later at middle of whorl, weaker than others; cords evenly distributed, granular; beads produced by intersection with axial ribs. On third whorl, primary cords more or less similar in size; beads becoming sharp, beads of P4 stronger and sharper than the ones of other cords; spines adapically oriented on P1 and almost horizontally on P4; S1 appearing at mid whorl, quickly similar to P1. On fourth whorl, S2 appearing at mid whorl; P1 moving towards suture; T1 appearing between P1 and S1; S3 absent; S4 emerging from suture at end of whorl; axial ribs still strong and visible; occasionally, T2 may appear between S1 and P2 (paratype CP69/2). On last whorl, P4 forming weak carena and giving periphery subangular shape; distance between cords of same size as cords, except interval between P3 and P4 fairly broader.

Aperture rounded to elliptical; outer lip with rather thin exterior prominent varix (width of about 0.25 mm), crossed by all spiral cords with production of weak thickening at meeting points, followed by a thin expanded lip broader than varix and sculptured by spiral cords and crowded axial ribs; inside of outer lip flaring, lirate within with about 20 plications, the innermost fairly broader.

Columella straight, opisthocline, excavated, deeply notched, with a basal strong obtuse prominent tooth and an adapical shoulder; columellar shield strong, concealing basal cords over which it lies.

Base moderately convex, sculptured with 6 or 7 granular spiral cords, similar in size; interspace between cords less than or equal to cords, filled with broad axial threads.

Colour of protoconch and teleoconch tile-brown, without maculations.

Operculum horny, multispiral but with volutions hard to count accurately regarding dry state of all available specimens.

	H	W	HA	H/W	H/HA
holotype CP69 (MNHN)	12.9	9.0	4.8	1.4	2.7
paratype CP69 / 1 (MNHN)	12.9	9.3	4.9	1.4	2.6
paratype CP69 / 2 (MNHN)	16.6	11.2	6.4	1.5	2.4
paratype CP69 / 3 (ZMA)	11.4	8.8	4.4	1.3	2.4
paratype CP25 (MNHN)	11.6	8.7	5.0	1.3	2.4

Table 2. – *Danilia galeata* : Shells measurements in mm for types.

Discussion. The high spire of *Danilia galeata* n.sp. allows comparison with only a few other *Danilia* species.

The new species may be compared to *D. insperata* Beu & Climo, 1974 (Figs 28-29) from New Zealand, but this similar in size species has a less high and more turbinate shape, a rounded periphery, a broader interval between spiral cords on the whorls and on the base, a broader distance between axial ribs and consequently between the beads of the cords.

D. galeata n.sp. also slightly resembles *Danilia telebatha* Hedley, 1911 (Figs 33-34) from southern Australia, but this latter species shows more convex

whorls, broader and less numerous spiral cords and a smaller aperture.

D. galeata n.sp. differs from *Danilia kuroshio* Okutani, 1968 (Figs 30-32) from Japan

because this taller species has more convex whorls, much more crowded axial ribs and consequently more crowded beads on the spiral cords, a square columellar tooth and a broader distance between spiral cords.

Etymology. Galeatus (Latin : helmeted) - with reference to the shape of the spire of the shell that remembers an helmet.

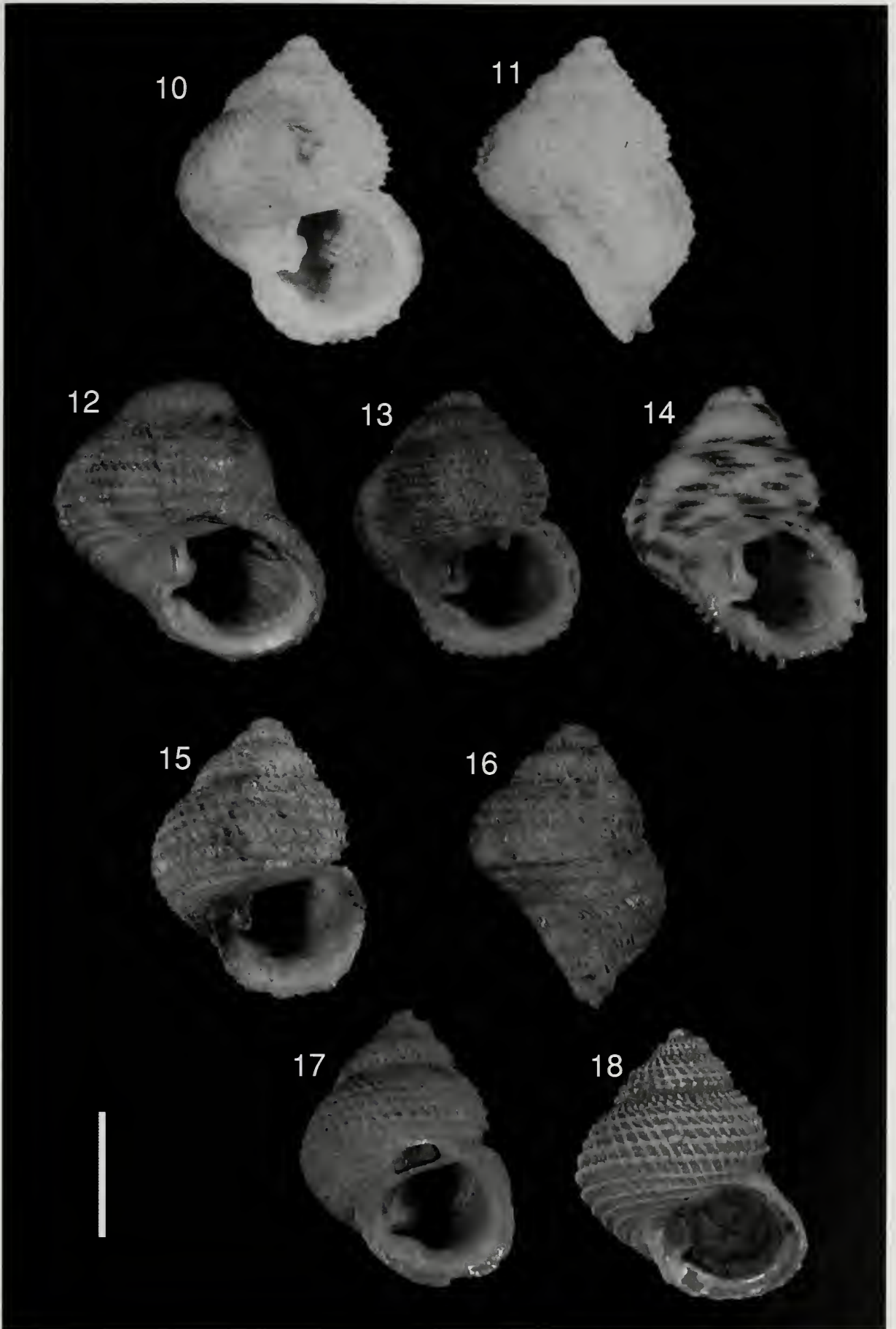
Figures 10-18. Scale bar = 5 mm.

10-14. *Danilia weberi* Schepman, 1908.

10-11. Syntype ZMA (3.08.090-091), Indonesia, 275 m, 12.6 x 10.3 mm; **12.** Specimen MNHN, South-western Pacific, 400-420 m [MUSORSTOM 7, stn CP629], 12.4 x 13.0 mm; **13.** Specimen MNHN, Taiwan, 305 m [TAIWAN 2001, stn DW36], 9.5 x 8.3 mm; **14.** Specimen MNHN, Fiji, 416 m [BORDAU 1, stn CP1394], 10.8 x 9.7 mm.

15-18. *D. eucheliformis* (Nomura & Hatai, 1940).

15-16. Holotype SHKMNH (14779), Japan Sea, off Kyuroku-sima Island, 210 m, 9.6 x 7.6 mm; **17.** Specimen MNHN, Taiwan, 420 m [TAIWAN 2001, stn DW37], 8.8 x 6.5 mm; **18.** Specimen MNHN, 248-257 m [TAIWAN 2001, stn CP101], 8.3 x 7.0 mm.



Danilia discordata n. sp.

Figs 25-27

Type material. Holotype (11.8 x 9.2 mm) MNHN.

Type locality. Vanuatu, 16°14'S, 167°21'E, 375-397 m, [MUSORSTOM 8, stn DW1060].

Material examined. Only known from the type material. Vanuatu. MUSORSTOM 8; stn DW1060, 16°14'S, 167°21'E, 375-397 m, 1 dd (holotype).

Distribution. Vanuatu, 375-397 m.

Diagnosis. A rather tall *Danilia* species, with a rather high spire, a conical shape, an ovate aperture, a square columellar tooth, strong axial ribs and 9 strong spiral cords on the last whorl, all flat except the adapical one and the two peripheral ones that are spiny; the beads of flat cords are very flattened and horizontally elongated.

Description. *Shell* of medium size for the genus (estimated height up to at least 12 mm, width 9.2 mm), conical, rather thin; spire rather high, height 1.3x width, 2.5x aperture height; periphery subangular; anomphalous.

Protoconch unknown.

Teleoconch of about 5 convex whorls (estimated - first whorl missing), bearing prosocline threads and spiral cords; cords granular; beads of cords rounded on first whorls and becoming quickly flattened and horizontally broadened on succeeding whorls, except spiny beads of abapical cord; middle of beads from cords connected by axial threads on all whorls; axial threads still strong on last whorl, as flat as spiral cords.

Suture visible, impressed, weakly canaliculated.

On second whorl, P1, P2, P3 and P4 present, similar in size; S1 appearing at start of whorl, slightly weaker than others; interspace between ribs almost 3 times larger than width of ribs; cords evenly distributed, granular, beads produced by intersection with axial ribs; beads of P1, S1 and P1 small, rounded; beads of P3 weakly sharp; beads of P4 spiny. S2 appearing half a whorl later, quickly similar in size and shape to P1 and P2. S3 absent. On third whorl, T1 and T2 appearing almost simultaneously, T1 between P1 and S1, T2 between S1 and P2; primary and secondary cords more or less similar in size, except P4 much stronger; beads of P1

becoming sharp, spines adapically oriented; beads of P4 becoming spines, horizontally oriented; beads of other cords still small, flattened; axial ribs still strong and visible, also flattening. On fourth whorl, all cords except P1 and P4 widened and flattened, with beads becoming horizontally broadened; beads of P4 becoming strong spines; S4 emerging from suture at end of whorl, weaker than P4, with weakly pointed beads; axial ribs flats, almost as broad as spiral cords. On last whorl, P4 forming spiny keel, giving periphery subangular shape; distance between cords of same size as cords.

Aperture rounded, flaring; outer lip with rather thick (width of about 0.45 mm) and very prominent exterior varix, followed by an expanded lip much broader (width of about 1 mm) then varix and sculptured by spiral cords and crowded thin axial ribs; inside of outer lip lirate within with about 18 rather weak plications and 3 much stronger plications near inner lip.

Columella straight, opisthoclinal, deeply excavated, deeply notched, with a basal strong square prominent tooth and an adapical obtuse tooth; columellar shield strong, transparent and covering basal cords.

Base convex, with 10 granular spiral cords, thick cords alternating with thinner cords; interval between cords less than or equal to cords, filled with thin axial threads.

Colour of teleoconch putty-coloured with axial chestnut brown maculations.

Operculum unknown.

Discussion. Regarding the ontogeny of spiral cords, *Danilia discordata* n. sp. is close to *D. galeata* n.sp. (Figs 19-24), but the latter species has a very different spiral sculpture without flat and broadened cords, a weaker and more flattened varix near the outer lip and a columella that is less excavated, with a weaker, pointed (not squared) basal tooth.

The only other species that can be compared to the new species is *D. insperata* Beu & Climo, 1974 (Figs 28-29) from New Zealand, which is similar in size, but has a more rounded periphery, much thinner spiral cords with a broader interval between them on the whorls and on the base, a broader distance between axial ribs and a blunt, not strong and squared, columellar tooth.

Etymology. *Discordare* (Latin: to contrast) - with reference to the contrast of the spiny shape of peripheral and subsutural spiral cords with the flattened appearance of the other ones.

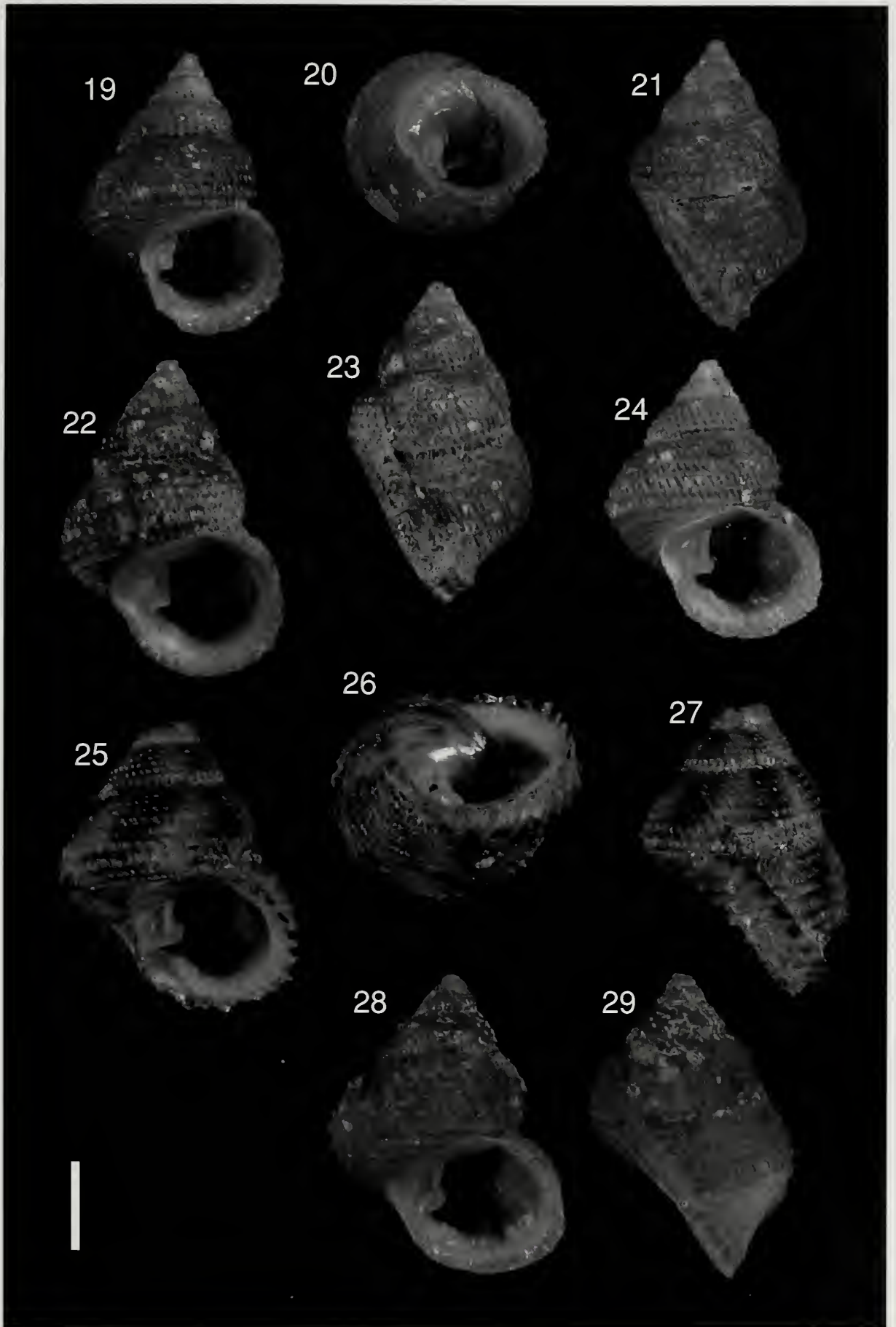
Figures 19-29. Scale bar = 5 mm.

19-24. *Danilia galeata* n. sp., Indonesia, Tanimbar Islands, 356-368 m [KARUBAR, stn CP69].

19-21. Holotype MNHN, 12.9 x 9.0 mm; **22-23.** Paratype MNHN, 16.6 x 11.2 mm; **24.** Paratype ZMA, 11.4 x 8.8 mm.

25-27. *D. discordata* n. sp., holotype MNHN, Vanuatu, 375-397 m [MUSORSTOM 8, stn DW1060], 11.8 x 9.2 mm;

28-29. *D. insperata* Beu & Climo, 1974, NMNZ (M.052776), eastern New Zealand, South Island, North-East of Banks Peninsula, 512-1006 m, 14.7 x 11.3 mm.



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APPENDIX

Provisional list of Recent *Danilia* species of the West-Pacific

Rather recent papers on *Danilia* species (Okutani, 1968; Beu & Climo, 1974) listed the Recent Indo-Pacific species of this genus. In the table below, these species, including the three new species described here, are listed with their distribution and compared on the base of their average dimensions, spiral cords, colour and shape of columellar tooth.

Regarding European *Danilia*, *D. otaviana* Cantraine, 1835 has been separated from *D. tinei* (Calcare, 1839) and seems to be a only Fossil species (Palazzi & Villari, 2001). The same authors recognize a second Mediterranean species, *D. costellata* (O.G. Costa, 1861). Data on *D. affinis* Dautzenberg & Fischer, 1896 are its original description, which was based on a single broken specimen.

Data on Australian and Japanese *Danilia* are from their original description (Schepman, 1908; Hedley, 1911; Nomura & Hatai, 1940; Okutani, 1968; Beu & Climo, 1974) and works about malacofauna of these areas (Cotton, 1959; Wilson, 1993; Higo, Callomon & Gotô, 1999; Sasaki, 2000).



Figures 30-34. Scale bar = 5 mm.

30-32. *Danilia kuroshio* Okutani, 1968.

30-31. Holotype NSMT (Mo-69541), Japan, off Hachijo Island, 525 m, 13.2 x 10.3 mm; 32. Specimen MNHN, Solomon Islands, 157-253 m [SALOMON 1, stn DW1778], 7.5 x 6.3 mm.

33-34. *D. telebatha* Hedley, 1911, paratype AMS (C31856), southern Australia, off Cape Wiles, 180 m, 9.4 x 7.0 mm - Photographs taken by Holly Barlow, Australian Museum.

<i>Danilia</i> species	H x W (estimated average in mm)	spiral cords on the last whorl		number of spiral cords on the base	colour	shape of the basal columellar tooth	known distribution
		num- ber	distance between (in terms of thickness of cords)				
<i>D. affinis</i> Dautzenberg & Fischer, 1896	10 x 7	6	1x to 1.5x	3-4	yellowish grey with axial reddish brow flames	rather strong, sharp	Azores, 454 m
<i>D. angulosa</i> n.sp.	7,5 x 5.5	7	1x (abapical area), 2x to 3x (adapical area)	7-8	yellowish or ochre beige, with brown dots or brown flammules	strong, sharp	from New Caledonia to Tonga Is., 130-555 m
<i>D. costellata</i> (O.G. Costa, 1861)	10 x 6.5	5-6	1x to 1.5x	3	light brown	small, obtuse	Mediterranean, ?
<i>D. discordata</i> n.sp.	11.8 x 9.2	9	1x	10	putty-coloured with axial chestnut brown maculations	strong, square	Vanuatu, 375-397 m
<i>D. galeata</i> n.sp.	13 x 9.5	8-9	1x	6-7	tile-brown	strong, obtuse	Indonesia, 346-356 m
<i>D. eucheliformis</i> (Nomura & Hatai, 1940)	11 x 9.0	7	1.5x to 2x	5	pale yellow to greyish brown	strong, rounded	from Japan to Indonesia, 210-420 m
<i>D. insperata</i> Beu & Climo, 1974	15.5 x 11.5	9-11	1.5x to 2.5x	3-5	pale straw, with reddish-brown blotches on terminal varix, between spiral cords	moderate, blunt	New Zealand, 448- 512 m
<i>D. kuroshio</i> Okutani, 1968	13 x 10	8	2x to 3x	7	brownish or cream with brownish flames	moderate, square	West-Pacific, 124- 720 m
<i>D. telebatha</i> Hedley, 1911	13 x 12.5	6-7	1.5x to 2x	3-4	cream with oblique light- brown flames below the suture and on the base	round to weakly pointed	Southern Asutralia, 150-180 m
<i>D. tinei</i> (Calcara, 1839)	11 x 9	6	1x to 1.5x	3-4	cream with axial brownish flames	strong, square	Mediterranean Sea and north-eastern Atlantic, 20- 2000 m
<i>D. weberi</i> Schepman, 1908	16 x 11	12	1x to 1.5x	12	dull white with brown maculations or flames	strong, quadrangular	West-Pacific, 275- 587 m

Table 3. – List of Recent *Danilia* species.

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